

What is claimed is:

1. An optical functional device having a periodic structure with refractive indices varying in recurring periodic patterns,

wherein the periodic structure is variable.

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2. An optical functional device as claimed in claim 1,

wherein the periodic structure includes a medium having an electro-optical effect, and by electrically controlling the medium from outside, it is possible to vary the periodic structure.

3. An optical functional device as claimed in claim 2,

wherein the medium is liquid crystal.

4. An optical functional device as claimed in claim 1,

wherein the periodic structure is formed by elastic waves propagating in one or more media, and the periodic structure is varied by electrically controlling the frequency of the elastic waves from outside.

5. An optical functional device as claimed in claim 1,

wherein the periodical structure is two-dimensional.

6. An optical integrated device comprising:

a waveguide portion for guiding light; and

a periodic structure portion to which light is directed by the waveguide portion, and

which has a periodic structure with refractive indices varying in recurring periodic patterns,
wherein the periodic structure is variable.

7. An optical integrated device as claimed in claim 6, further comprising:

5 another waveguide portion for guiding light emitted from the periodic structure
portion.

8. An optical integrated device as claimed in claim 6, further comprising:

10 a voltage applying portion for applying a voltage to the periodic structure portion for
varying the periodic structure.

9. An optical integrated device comprising:

15 a periodic structure portion which has a periodic structure with refractive indices
varying in recurring periodic patterns, and of which the periodic structure is variable; and
a waveguide portion for guiding light.

10. An optical integrated device as claimed in claim 9, further comprising:

a voltage applying portion which applies a voltage to the periodic structure portion for
varying the periodic structure.

11. An optical integrated device comprising:

a light source portion that can vary wavelengths of emitted light; and
a periodic structure portion which has a periodic structure with refractive indices
varying in recurring periodic patterns,

wherein the periodic structure is variable.

12. An optical integrated device as claimed in claim 11, further comprising:
a waveguide portion for directing light to the periodic structure portion.

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13. An optical integrated device as claimed in claim 12, further comprising:
another waveguide portion for guiding light exiting from the periodic structure portion.

14. An optical integrated device as claimed in claim 12, further comprising:
a waveguide portion for guiding light exiting from the periodic structure portion.

15. An optical integrated device as claimed in claim 12, further comprising:
a voltage applying portion that applies a voltage to the periodic structure portion for
varying the periodic structure.